TRANSMITTAL LETTER (General - Patent Pending)	Docket No. EN998082

In Re Application Of: **Boice et al.**

Serial No.	Filing Date	Examiner	Group Art Unit
09/255,892	02/23/99	S. An	2713

Title: **DYNAMICALLY SWITCHING QUANT MATRIX TABLES WITHIN AN MPEG-2 ENCODER**

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Transmitted herewith is:

Appellants' Reply Brief

in the above identified application.

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Dated: **January 05, 2001**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of BOICE ET AL

Serial No: 09/255,892

Group Art Unit: 2713

Filed: February 23, 1999

Examiner: An, S.

APPELLANTS' REPLY BRIEF

Appeal No.:

For: DYNAMICALLY SWITCHING QUANT MATRIX TABLES WITHIN AN MPEG-2 ENCODER

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Board of Patent Appeals and Interferences, Washington, D.C. 20231, on January 05, 2001.

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To: Assistant Commissioner for Patents
Board of Patent Appeals and Interferences
Washington, D.C. 20231

Wit

Boice, et al.
Serial No.: 09/255,892
Filed: February 23, 1999

Appellants' Reply Brief

Sir:

This Reply Brief is being timely filed in triplicate pursuant to 37 C.F.R. §1.193(b) in rebuttal to certain conclusions set forth in the Examiner's Answer mailed November 7, 2000, for the above-designated appeal.

Remarks

Appellants respectfully disagree with the Examiner's characterization of the teachings of Wheeler et al as set forth at page 6, lines 3-13 of the Answer. Appellants respectfully submit that the Answer appears to be confusing the well understood "quantization matrix tables" with the equally well understood "MQUANT" value.

In accordance with MPEG standard, "MQUANT", also known as the step-size by one skilled in MPEG, is a singular value. The value of the MQUANT per MPEG standard can vary between 1 and 112. There are two types of MQUANT known as type '0' and type '1'. Depending on the MQUANT type, there are 31 possible values in the range of 1 to 112.

In contrast, the "quant matrix tables" are, for example, an array of 64 values arranged in an 8 x 8 format. The quant matrix tables are also known as the "individual quantization factor matrix" and the "weighting matrix" by one skilled in MPEG. The term weighting matrix is applied because the location of the individual quantization value in the matrix is to weight the

corresponding pixel coefficient location in the macroblock undergoing quantization.

In a typical MPEG encoder, the quantization process is two steps. In the first step, the "quant matrix tables" are used. This is where the individual quantization factors are applied against the corresponding coefficients of the macroblock undergoing quantization. The coordinates of the quantization factor in the matrix correspond to the location of the coefficient within the macroblock. The second step uses the MQUANT. The MQUANT is applied against all of the coefficients from the macroblock.

Figure 7 of Wheeler et al. is one possible implementation of the quantization process. As clearly shown in this figure the "quant matrix tables" are held in storage 690, while the MQUANT is in register 692. Also, as stated by Wheeler et al. at column 13, lines 20-24:

> As described above, there are two levels of quantization in MPEG/JPEG and H.621; the first uses the quantization tables (such as quantization matrix 434 in fig 19A), and the second is the marcoblock scaling factor MQUANT.

In view of the above, Appellants respectfully traverse the conclusion stated in the Examiner's Answer at page 6 concerning the teachings of Wheeler et al. In particular, page 6, lines 6 & 7 of the Examiner's Answer asserts:

> Each value of the MQUANT corresponds to a quantization table (Wheeler: fig 7, 690).

Appellants respectfully submit that there is no support in Wheeler et al, nor in the MPEG art for equating the MQUANT or step-size with the quantization matrix tables. Wheeler et al. positively teach in figure 7 that the MQUANT resides in a register 692, while the quantization matrix tables reside in RAM 690.

In Appellants' claimed invention, there is no attempt to modify the standard quantization process. Rather, an enhancement is submitted whereby a user is allowed multiple sets of quantization matrix tables. In claim 1, for example, Appellants recite that the multiple sets of quantization matrix tables held in storage comprise separate, independent sets of quantization matrix tables, with each set of quantization matrix tables comprising at least one intra matrix table and at least one non-intra matrix table. Each set of tables can thus be completely different from the other sets of tables, with the only common thread being, for example, the 8 x 8 structure of 64 weighting factors. The user would be allowed to modify sets and change complete sets or portions of a set without delay or restrictions on the encoding process. In other words, Appellants

submit a system for real time updating and changing of a set of quantization matrix tables.

Appellants respectfully submit that a careful reading of Wheeler et al., and the Examiner's Answer, fails to provide any support that the above-summarized aspects of Appellants claimed invention were known to one of ordinary skill in the art based thereon. Since Wheeler et al. fail to discuss or imply storing of multiple sets of quantization matrix tables, where each set of quantization matrix tables comprises a separate, independent set of tables, and each set comprises of at least one intra matrix table and at least one non-intra matrix table, Appellants respectfully submit that there can be no teaching of switching between such sets of quantization matrix tables. The present invention adds the ability to dynamically switch from one complete set of intra and non-intra tables to another complete set of intra and non-intra tables in real time, in a single pass without requiring stopping of the encoding process. Since there is no teaching of this set switching concept in Wheeler et al., Appellants respectfully traverse the conclusions stated at page 6, lines 3-13 of the Examiner's Answer.

In addition, the Answer states at page 7, lines 1-5:

> The Examiner concurs with the Appellants notion that Katayama is describing encoding of still photographs which may contain character information (Appellants Brief, page 12, lines 5-6) and that encoding of still photographs is significantly different than

encoding motion video (page 12,lines 21-22). However, Wheeler et al clearly teaches utilizing quantization tables either in MPEG or JPEG (implies a still photograph) (Wheeler: col. 13, lines 20-24).

Appellants respectfully traverse the above-characterization of the teachings of Wheeler et al. at column 13, lines 20-24, which as set forth on page 3 of this Brief, merely state that there are two levels of quantization in MPEG/JPEG and H.621. There is no discussion in Wheeler et al. of still photography. In fact, the patent expressly teaches otherwise at column 1, lines 19-23 which state: "General techniques for performing compression are set forth in common video compression standards such as MPEG (Moving Frames Expert Group), and **motion** JPEG (Joint Frames Expert Group) and H.621. (Emphasis added)

A careful reading of Wheeler et al. fails to provide any support for the quantization techniques described therein being applied to still photography, and thus, Appellants respectfully traverse the Examiner's rational for combining the "quantization matrix tables" comprising intra table and non-intra table as taught by Wheeler et al.

As noted by Appellants in their Appeal Brief, encoding of still photographs is significantly different than encoding motion video. In a still photograph encode process, all pixel information is used, i.e., intra data of the photograph is used in order to detect edges of the characters. Thus, Appellants

respectfully submit that one skilled in art would understand Katayama as using intra-coded tables only for the chrominance and luminance tables referred to in the patent. Non-intra-coded tables could not exist in a still photograph encode process such as described by Katayama, nor would they be useful. As understood by one skilled in the art, non-intra matrix tables arise and are employed during motion estimation, i.e., for bi-directionally encoded frames of a video. Thus, Appellants respectfully submit that Katayama inherently teaches away from the proposed combination with Wheeler et al., in addition to there being no support in Wheeler et al. for the proposed combination set forth in the Examiner's Answer.

For the above-stated reasons, as well as those set forth in the Appeal Brief, Appellants respectfully request reversal of all rejections.

Respectfully submitted,

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